

Things to Know, Understand and Do For Chapter 14: Acids and Bases

1) Know and apply Arrhenius, Bronsted-Lowry and Lewis Definitions of acids and bases and apply on specific examples.
2) Recognize acids and bases in reactions and identify the conjugate partner of each.
3) Recognize common monoprotic and polyprotic acids and bases and write balanced equations for their ionization in water.
4) Define acid/conjugate base pairs in a reaction as well as write formulas for conjugate acids and conjugate bases of specific compounds or ions.
5) Know and apply definitions of amphiprotic and amphoteric.
6) Understand the concept of water autoionization, what the hydronium ion (H_3O^+) represents. Use the water ionization constant, K_w .
7) Identify if a compound or ion is a strong or weak acid or base.
8) Write equilibrium constant expressions for weak acids and weak bases.
9) Understand that weak acids can be molecules (like acetic acid), cations (NH_4^+) or hydrated metal cations $[\text{Fe}(\text{H}_2\text{O})_6]^{3+}$ or anions (HCO_3^-).
10) Calculate pK_a from K_a , or visa versa
11) Understand the relationship between K_a for a weak acid and K_b for its conjugate base.
12) Write hydrolysis reactions for any acid, base (strong or weak) or to show that a specific ion or compound is an acid and/or base.
13) Write equations for acid-base reactions and decide whether they are product-favored or reactant-favored.
14) Predict if a solution of a compound/salt/ion is acidic or basic.
15) Calculate the $[\text{H}^+]$, $[\text{OH}^-]$, pH and pOH of any solution containing a weak or strong acid or base (including salts).
16) Calculate K_a or K_b of any species (usually the conjugate acid or conjugate base) using K_w
17) Use pH, %ionization and concentration of a compound or ion to calculate pH, pOH, K_a , and/or K_b of this specie.
18) Understand and explain on the molecular bases what makes some acids strong while others weak; all acids and oxyacids.
19) Calculate the pH of a mixture of weak acid (or weak base) and its conjugate base (or conjugate acid).
20) Calculate the $[\text{H}^+]$, $[\text{OH}^-]$, pH and pOH after know volumes of known concentrations (therefore known moles) of strong acids and strong bases are mixed
21) Calculate the $[\text{H}^+]$, $[\text{OH}^-]$, pH and pOH after know volumes of known concentrations (therefore known moles) of strong acids and weak bases OR weak acids and strong bases are mixed. [ICF to ICE]
22) Calculate the pH of a solution of a polyprotic acid or base.

Chapter 14 Homework

P 672 Q 1, 5
 P 673 Q 25, 26, 28, 30
 P 674 Q 42, 46, 49
 P 675 Q 51, 56, 60, 65, 67, 73
 P 676 Q 89, 92, 93, 96, 107
 P 677 Q 113, 117, 120, 123
 P 678 Q 139, 154

Student Presentations

P 674 Q 50
 P 675 Q 55
 P 676 Q 90
 P 677 Q 109